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403953

MONTHLY STATUS REPORT
DIVISION OF BIOLOGY AND MEDICINE
Month of December, 1951

This material contains information affecting the national defense of the [redacted] transmission or [redacted] in any manner to an unauthorized person is prohibited by law.

<u>Weapons Test Activities (Buster-Jangle)</u>

<u>Project Gabriel</u> [redacted]. Project Gabriel was an evaluation of long-range hazards associated with the detonations of a large number of atomic air bursts. This report and the deliberations of an ad hoc committee which met in November were given further consideration in a staff study, and utilizing additional data from Buster-Jangle data the studies were extended to calculate short-range effects. These were considered under three possible conditions: (a) a high air burst without rain or snowfall; (b) a high air burst with early rain or snow; and (c) a low air burst, surface burst, or underground burst.

<u>Monitoring at Test Site (Buster-Jangle)</u> [redacted]. Personnel within the test site area were issued film badges by the RadSafe Unit. The final personnel radiation report requires some upward revision of exposures previously reported. This report shows that of the 1,749 persons with badges none exceeded an integrated dose of 6 roentgens, and only 12 exceeded 4 roentgens. These twelve represent less than 0.7% of the total personnel subject to exposure. The average integrated exposure was about 1.2 rotengens.

The timing of each shot with respect to weather conditions was the major factor in no significant fall-out in populated areas. However, surveys of fall-out in the test area were made by helicopter and estimated results show "hot" areas with integrated doses of 75 roentgens at 15 miles from the surface shot, and 175 roentgens at 9 miles from the underground shot. Since these specific areas were observed within the Nevada Test Site, they do not represent a health problem to populated areas. However, such fall-out patterns are phenomenon not fully understood or predictable. Further monitoring should provide data upon which to base predictions of fall-out patterns for future tests.

<u>Monitoring of Air Activity</u>. [redacted]. To assess air activity, two groups were utilized for Buster and twelve for Jangle within the limits of 10 to 200 miles of the test site. The Jangle Feasibility Committee requirements for populated areas called for a limit of 100 microcuries per cubic meter of air, averaged over a period of 24 hours. In the case of particles having diameters in the range of zero to five microns, the 24-hour averaged activity per cubic meter should not exceed 1/100 of the above; nor was it desirable that any individual particle in this size range have an activity greater than 10^{-2} microcuries calculated four hours after the shot. Although the air activity near the surface following Jangle shots was about 10 times greater than following Buster detonations, no activity was found that exceeded the requirements of the Jangle Feasibility Committee. The margin between the required and observed air activity was small, which indicated the necessity for continuing such air sampling programs at future tests. The responsibility for monitoring air activity beyond 200 miles, and within the continental limits of the U. S., was assigned to the [redacted] Safety Division of NYOO. These data are being correlated for further study and use.

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AEC Personnel Shelter Test. ([redacted]) The protection of AEC personnel and plant installations continues to be of prime importance to the Commission. In addition, security and geographic considerations require that civil defense measures be implemented. Civil defense practices and protective construction have been under constant study and review to insure optimum protection for workers or plants, and to insure against heavy production losses.

A recent survey in connection with the disaster planning program was completed which assessed individual installations in terms of criticality and vulnerability. Shelters were recommended for construction at prime target areas and a prototype shelter was designed for testing during Operation Buster in the fall of 1951. The design criteria for this shelter is described in the November report.

The first preliminary report prepared by the Civil Defense Liaison Branch on this project has been submitted to the Test Organization whose purpose is to plan and conduct the Weapons Test, and to review and analyse the results. This report will also be furnished to the FCDA for use in civil defense shelter studies. [redacted]

Direct and Genetic Effects of Radiation in Mammals. (UNCLASSIFIED)

Current data on biological effects of radiation in mammals has been assembled in summary form by Dr. H. M. Plough of the Biology Branch. This memorandum outline represents a compilation of much of the literature on the subject and lists many references. The paper will be distributed to the various Divisions to serve as a working summary in discussions of permissible radiation dosage or expected genetic effects. Copies are available from the Biology Branch for those who may have an interest in the subject.

Low Level Portable Cobalt Irradiator (UNCLASSIFIED)

A pilot model portable cobalt irradiator was developed by the Brookhaven National Laboratory under the direction of the Division of Biology and Medicine. This experiment was completed with successful results. Arrangements have been made to deliver this instrument to the Worcester Foundation for Experimental Biology. The Foundation will use the instrument in the program for investigating the effects of radiation on the protection of the adrenal corticle hormones.

This cobalt irradiator is designed to handle a moderate level source up to 250 curies of cobalt 60, and will fill a definite need in the experimental radiobiology program of the Commission for cheap flexible sources of highly penetrating gamma radiation for use in animal and other experiments.

The pilot unit described above was designed and fabricated at a cost of approximately $7,500. It is estimated that the cost of additional models of this type constructed commercially should cost between $4,000 and $5,000.

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Research in Fractionation of Formed Blood Elements. (UNCLASSIFIED)

The Harvard University Laboratory has made significant progress on the AEC-research project on separation of the formed blood elements. This study is being conducted by Doctors E. J. Cohn and J. L. Tullis. It has been found that blood platelets may be quantitatively isolated from blood being processed in the national blood program, and recovered in relatively undamaged form for subsequent medical study. The importance of this work lies in the fact that blood platelets are a necessary factor in controlling the hemorrhagic state which accompanies exposure to high dosages of ionizing radiation. In radiation injury of this nature the platelet producing mechanism of the bone marrow is damaged and patients frequently die of multiple internal hemorrhages. If these platelets prove to be viable they will contribute greatly to the therapy of radiation injury. Similar progress has been made in the isolation of the white blood cell fractions from processed whole blood. The white cells are under investigation to determine if they may be transfused into patients suffering a deficiency of white blood cells, and thus aid in combatting the overwhelming infection which frequently accompanies acute exposure to whole body radiation.

Fellowship Program - Health Physics (UNCLASSIFIED)

The latest class of the Fellowship Program conducted at ORNL included 20 members. Information has been received from the Laboratory that nineteen of the group had received offers for employment prior to graduation. It is understood that the twenty members under this program at Rochester-Brookhaven have also been solicited for employment.

Visit to Savannah River Site (UNCLASSIFIED)

A recent visit was made by staff members to the Savannah River Site to study the biological and medical problems relevant to plant operations. The progress was reviewed of the biological survey being conducted under the auspices of the University of South Carolina, the Philadelphia Academy of Natural Sciences, and the U. S. Public Health Service. This survey involves an accurate record of aquatic life in the area. These observations will be compared with the results of similar surveys made later in order to determine the effects on aquatic life of small amounts of radioactive material released into the streams.

Meeting of A.A.A.S. (UNCLASSIFIED)

The Director and representatives of the Division attended meetings held by the AAAS in Philadelphia from December 26-31. The session of the Symposium on Cancer Therapy with Radioisotopes included the address of Dr. Shields Warren on "The Impact of Radioisotopes in Cancer Research."

Other sessions included papers on effects of radiation on animal tissues; effects on the skin tissues; summarization of the study of the production of cataract and retinal damage by irradi[redacted] the heads of new-born mice; and methods of following deposition in mollusc shells by radiocalcium.

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